

AVIATION

DECEMBER 18, 1922

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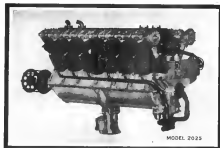
SPECIAL FEATURES

Number
25

THE AUTOCARTOGRAPH
AIR APPROPRIATIONS FOR NEXT YEAR
ADMIRAL MOFFETT'S REPORT ON NAVAL AVIATION

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DECEMBER 18, 1922

AVIATION

VOL. XIII NO. 25

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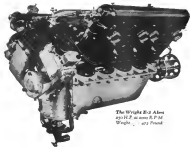
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AVIATION

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No. 15

General Pershing on Air Power

THE general avowance as to the necessity of a strong air force in the Army and the Navy among the higher authorities during the last year is indicated by the recommendations issued by General Pershing on the requirements of the country for preparation for air defense. Until recently the general impression has prevailed that the General Staff of the Army has been unconcerned by the arguments presented to it for adequate aerial equipment. With General Pershing's unexpected statement it would appear that now there can be expected a greater development of the Air Service.

In the Navy, the gains in the last year have been very visible. The conversion of two battleships into aircraft carriers, the mobilization of transports as seaplane ships and the development of seaplanes have all been an indication that the Navy is aware of the danger from the air.

What is needed by both branches of the national defense is a reduction of the necessity for preparation in advance for combat. Aircraft and trained personnel cannot be stored in quantity after the outbreak of hostilities. Such preparation must be made in time of peace. And the cost of such provision is only a fractional part of the expenditures required for ready equipment and training.

Two methods are obvious. The maintenance of an aircraft industry that has sufficient work to keep it going on a minimum scale is fundamental. To do this, there must be encouragement of the two kinds of companies, those that are specialized in engineering development, and those that are able to manufacture on a production basis. Sets of blue prints with complete specifications to turn over to manufacturers of other products have never brought results as immediate (and of course of great value) as an enterprise.

The other and equally important requirement is trained pilots. While commercial aviation would provide a source of pilots, it is generally recognized that the mere ability to fly is only a minor part of the knowledge required by a military aviator. The encouragement of reserves and the national guard are methods in the most economical method of securing trained personnel.

If General Pershing's public announcement will give the Air Service that cooperation and support it needs from the whole Army, it will have been another great step toward air preponderance.

A Sound Policy

THE National Advisory Committee for Aeronautics in its second report for 1932 has given expression to a national aeronautical policy that will commend its soundness to every well informed citizen. It follows:

Aviation has been almost indispensable to both the Army and the Navy. Neither can operate effectively without an adequate air service. What was considered adequate in the World War will not do in the future. There must be a

greater proportion of aircraft of all types, and they must all be of the most modern design. For this latter purpose, the committee emphasizes the need for continuous development. As the types and uses of aircraft for military and naval purposes differ in important particulars, the War and Navy Departments must continue to have charge of aircraft development for their respective services. Appropriations for aviation in the Army and Navy should be in the interests of national defense be ample, sure and at all times, to provide for continuous development. While it is possible that older and older branches of the two military services may have reached the periods of their greatest development, this is certainly not so with aeronautics.

While public sentiment is demanding reduction of the Army and Navy to a previous basis, it is the judgment of the National Advisory Committee for Aeronautics that it does not demand that the air services of the Army and Navy be so reduced, nor even that they be reduced proportionately with other branches of the Army and Navy. The necessity of warfare in the air, the lack of real aeronautical activities upon which is done in time of peace, the rapid developments in aeronautics that are taking place in other countries, the absolute necessity of aviation for national defense, and other factors all combined, have led the people to the support of a policy of progress and development in the aeronautical branches of the Army and Navy, however much they may insist upon the curtailment of other military and naval expenditures.

The increasing relative importance of aircraft in warfare is alone sufficient to justify the expenditure of public funds to aid the development of air navigation on a commercial basis. It has been the history of civilized nations that governments have found it necessary to aid in the development of means of transportation. The wonderful growth of transcontinental railroads in America was greatly aided by land grants from our Government. Progressive European nations are spending large sums, through direct and indirect subsidies, for the promotion of civil and commercial aviation. The practical development of aviation in America will not be realized until the Government gives additional support and effective aid, particularly by regulating and licensing and by cooperation with the States in the establishment of aerodrome and landing fields.

Extraordinary Bombing

TESTS held as part of the joint Air Service and Coast Artillery maneuvers at Fort Monmouth, N. J., during November have revealed the wonderful improvement in accuracy attained by the Air Service bombing units.

These latest bombing tests are but another demonstration of the effectiveness of "aerial artillery" in the defense of our coasts, and again point to the fact that given an adequate air force the chances of an enemy fleet coming within effective range of the fixed guns of the coast artillery would be extremely small.

server operation sheet every half minute Prof. Hagerhoff's special stereo-topographer cameras, taking views at an angle of inclination of 30 deg. to the ground and, if possible, at right angles to the direction of flight.

Thus having been done, the plates are developed and copied. The prints, in connection with existing triangulation points, are used to determine for each pair of plates the exact situation and altitude of those distinctly visible points on the photograph. The expendable scale proceeds to locate the place of the aircraft at the moment the perspective photographs were taken and to ascertain the angle of inclination with the aid of the measuring theodolite shown referred to. After that, each two measured photographs (original negatives or developed glass plates) are introduced into the auto-montage, in order there to be used in building up the map out of topographical sketches and level lines, as above described.

In order to be able to reproduce the greatest possible wealth of details, it is advisable to take aerial views with a camera fixed to the airplane in a perpendicular position, independently of the photographs above mentioned, which are taken at an angle. The most reliable method to be used in this connection is the Hagerhoff stereograph, which, by producing a series of numerous views automatically from the airplane, affords an excellent idea of the approximate configuration of the ground, showing the various forms on the map to be located in a very short time. When such details are necessary in order to ascertain the local names and details on the map

or to analyze the nature of the soil, for instance, in connection with road and railway construction, one of the cameras will have to take a walk through the country, collecting these data.

As regards the accuracy of this method, actual experience has shown the average errors of points that approximate to a height of 1,000 meters not to exceed a variation of 21.5 meters in the perpendicular or horizontal direction, which, of course, is quite sufficient for any topographic purpose. Moreover, this remarkable accuracy corresponds to such point of the network of stations and level lines drawn automatically, whereas in the case of horizontal topography these lines are obtained by interpolation and visual approximation. This is why the quality and uniformity of horizontal surveying depends to a very high degree on the reliability and accuracy of the staff, whereas maps automatically drawn by means of the mapping machine are much less dependent on the efficiency of the staff.

Interesting results were obtained at a competition held under the auspices of the Swiss Board of Survey, when Dr. Hagerhoff convincingly proved the superiority of the new method over the old one. A rather hilly country in the Emmentale mountains was surveyed consecutively by the old and the Hagerhoff method, when the two maps were found perfectly to agree both in its horizontal and vertical direction, though the new method afforded an average saving of time of 60 per cent. quite apart from the saving of funds and additional advantages.

Air Appropriations for Fiscal Year 1923-24

\$29,311,450 Asked for Army, Navy and Air Mail

The total of appropriations allotted in the budget for the fiscal year ending June 30, 1923, the House government approved—Army Air Service, Naval Aviation and Air Mail Service—is \$29,311,450.

Army Air Appropriation

The total allotments for the Army Air Service for 1923 are \$12,871,248 as against \$12,800,000 for the present fiscal year.

The general appropriations recommended for Air Service schools, employees, equipment, airplanes, balloons, sports, experiments, etc. in set down as \$12,671,308 compared with \$12,700,000 for the current year.

For aviation accident settlement in Insular Possessions, specifically a machine shop at Hawaii, \$18,000 is asked, and for departmental salaries \$100,000. This brings the total to \$12,871,308.

Naval Air Appropriation

The Bureau of Aeronautics, Navy Department, is allotted the sum of \$14,330,550 compared with the sum of \$14,300,500 for 1922. This appropriation is apportioned as follows:

For aviation management, photographic, aerological, radio and meteorological equipment, including repairs for use on aircraft, built or building on June 30, 1923, \$253,000; For maintenance, repairs and operation of aircraft factory, huts, plant, air stations, fuel services, testing laboratories, and for overhauling of planes, \$5,250,000, including \$500,000 for equipment of vessels with catapults.

The engineering experiments and development work on all types of aircraft, \$1,600,000.

For drafting, clerical, inspection and messenger services, \$775,000.

For new construction and procurement of aircraft and equipment, \$5,796,550.

In all \$24,073,550, provided that no part of appropriation shall be expended on maintenance of more than six observation-air stations on the coasts of the United States, and that as part of the appropriation shall be expended for construction of a factory for the manufacture of airplanes.

For salaries for employees of the Bureau of Aeronautics, \$652,000, and for salaries of draftsmen and technical experts, \$514,000, making a total of \$1,166,000, which will show down of \$14,677,550 makes a grand total of \$14,793,550.

Estimates of the expenditures and obligations are shown to be \$14,984,125. Estimated expenditures for 1923 are \$14,003,550 and estimated expenditures for 1924, \$14,673,550.

Air Mail Appropriation

In the Post Office appropriation recommended by the Budget Office there also appears an item for \$7,000,000 for the transportation of foreign mails by steamship, aircraft and otherwise, with the proviso that not in excess of \$150,000 be expended for the carrying of foreign mails by aircraft.

The bulk of the Air Mail budget estimates for 1923-24 are under the allotments for the Second Assistant Postmaster General, where an item of \$1,000,000 appears for the operation and maintenance of the airmail and service between New York and San Francisco, via Chicago and Omaha, including incidental expenses and the employment of necessary personnel. The figure for the current year was \$1,200,000. Estimated expenses for the next fiscal year give \$755,271 for personnel services, and \$177,728 for services including mail, gas, food improvements, supplies, etc. but the estimated expenses for the current year are shown as a total of \$1,025,000.

Our Hat is in the Ring



New French Commercial Airplane



The Farman F30 5-engine cabin ship (320 hp. Hispanics) which won the air transport competition for the Grand Prix of Paris. The clean and powerful lines of this ship are visible.

8th Annual Report of N.A.C.A.

President Harding Endorses Recommendations for a National Aeronautical Policy

Endorsing the National Advisory Committee for Aeronautics plan for the national development of aviation, the President has approved the eighth annual report of the N.A.C.A. to Congress with the statement that: "The constructive recommendations therein contained for the advancement of aviation demand the thoughtful consideration of all members of the Congress."

In presenting the eighth annual report of the National Advisory Committee for Aeronautics to the President, Dr. Charles D. Walcott, Chairman of the Committee, points out that the considerations of the Committee to the Secretary of Commerce have placed aeronautics in the forefront of progressive nations in aerial navigation. "In the art of aviation some line has industrial progress in the development of auxiliary and fixed types of airplanes, but commercial aviation has made very little headway," he states, adding that this is due, not so much to the technical problems and difficulties of air navigation, nor in the lack of technical knowledge, as to the lack of surveys, landing fields, and Federal legislation and licensing of aircraft and operators. Calling attention to the development of world transportation both by sea and road has depended largely on governmental aid, Dr. Walcott states that aircraft will prove even more profitable than railroads and automobile development. "In the opinion of the National Advisory Committee for Aeronautics," he explains, "it is essential and proper that the Federal Government should aid in the development of air navigation by providing Federal regulations and establishing airports and landing fields."

A policy for the development of aeronautics as a national asset important in time of peace as well as in time of war, is outlined in the Committee's report. The relative importance of aviation in war alone is said to be of sufficient importance to justify the expenditure of public funds to aid the development of aerial navigation on a commercial basis. The history of civilized nations shows, the report states, that governments have found it necessary to aid in developing air transportation systems, and that today the progressive nations of Europe are spending large sums of money in aid of military aviation for the promotion of civil and commercial aviation. Without sound financial assistance for the art, the report states that the greatest development of aerial navigation will be realized only when the Government gives intelligent support and effective aid, principally by engineering and licensing airplanes and pilots, and with state cooperation in establishing airports and landing fields.

A National Aeronautical Policy

Finally, the National Aeronautical Policy recommended therein that: "Aeronautics has already exerted a great influence on civilization, its security in military operations being definitely established, although its adaptation to commercial purposes has scarcely commenced."

The Committee's second development by the Legislation of Aeronautics, is believed sufficient to secure greater relative importance in future warfare on both land and sea.

Practical application of aviation in Air Mail Service within a few years, is one of the marvels of the age. Each improvement in transportation is known to have lightened man's labor, increased his prosperity and increased his knowledge of a new world. The maintenance of the service is recommended.

With the help of well-directed scientific research, with the organization of the people for research, and with cooperation in the application of aviation, aeronautics will reach, in peaceful pursuits its real contribution to the progress of civilization.

Scientific research in aeronautics is said to be the most important subject in the field of aerial navigation development. The Army and Naval services depend upon the work of the

Committee for the solution of the most difficult problems in the fundamental art of flight, which is the premier foundation of the Committee. The urgent need for simple funds and facilities with which to complete the construction of a research program already approved, is emphasized.

Federal regulation of aviation, with state cooperation, is urged by the Committee, which also recommends the creation by law of a bureau of civil aeronautics under the Department of Commerce.

Although public sentiment seems to be waning the relations of the Army and Navy to a pre-war basis, it is the policy of the Committee that the public does not demand that the air services of these arms be so reduced, nor even that they be reduced proportionately with the other branches of the Army and Navy. The necessity of aerial warfare, the lack of aerial aviation services from which to draw in time of war, the rapid development of aviation in other countries, and the necessity for aviation in national defense require the people to support a policy of progress and development in aeronautical branches of both the Army and Navy, however small they may seem upon comparison of other military expenditures, it is stated.

The Committee urges the development of our aviation structure methods and the conservation of our scarce supply of non-renewable lifting gas, through the acquisition of the fields and the making of the soils.

The development of aerological service along transatlantic routes, when established, is requested, and its acquisition by the services of the Government is urged. Because it is urged, as without an aerological service, it is emphasized, there can be no safety in the air war progress in commercial aviation.

Aerial Camera Aids Reconstruction Work

"The aerial camera is taking an commercial and highly important part in the reconstruction of the devastated areas of France and in the restoration of the total regions of Egypt and Mesopotamia, which in countries of such vast numbers of inhabitants," said Sherman M. Fairchild, president of the Fairchild Aerial Camera Corp., on his recent return from Europe.

It is interesting to learn that America leads the entire European nations in the profitable development of aerial photography, but in the practical application of the art on a national scale we must look to France as the leader. The French service the earlier of the war, have systematically about the development of aeronautics through utilization of every service offered.

"Shortly after the Versailles treaty was signed, a French law was passed requiring every city in the world, above a certain size, to be surveyed within three years. It would have been physically impossible and financially impracticable to accomplish this in greater numbers. The result was that aerial photography was required throughout, and our company alone surveyed 200 cities from airplanes.

Aerial mapping is being actively used by the majority of the world's regions. The maps of France devastated during the war are being reconstructed from the air, so to many more not only were property loss obliterated, but the records of cities reconstructed destroyed.

"One of them was surveyed from the air in a scale of 200 ft. to the inch, thus making it possible to identify even small buildings. Corrections such as new structures, streets, etc., were pointed in red over the existing maps. For this service the French company received the equivalent of \$400,000."

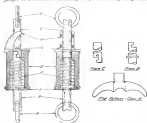
Mr. Fairchild believes that a rich field for development in aerial photography awaits American companies entering Central and South America, and such European countries as Russia, Greece, etc.

Greater Safety for the Parachute Jumper

Device to Eliminate Many of the Dangers of Parachute Landing

The development of a suitable release for the jumper upon reaching the ground has been of paramount importance in increasing the many difficulties in producing a safe parachute. The importance of getting clear of the ground at the time of landing the jumper may easily be appreciated, for serious injury might be sustained by the jumper were he to be dragged upon the ground before he could release himself from the parachute. There is also the danger of being pulled into a tree, a building, or any other obstacle.

In the older type of parachute it was the custom for the jumper to continue his retaining straps on leaving the ground



Quick release gear for parachute landings

in preparation to dropping out of his harness at the exact point of landing. Of course, the result is a rather difficult operation under most trying circumstances.

Due to the fact that the jumper will probably have heavy gloves on, and thus he will surely be cold and stiff from the jump, it is essential that a simple, easy operation, release be devised. It must be foolproof, it must be used and quick acting so that there will be no possibility of snagging or jamming at the critical moment, it must be simple and it must operate mechanically. It must be rugged and it must be able to release working loads which will be put upon it; it must also be completely light in weight.

Many devices have been invented with these ends in view, but most of them have one inherent defect which makes their use dangerous. One familiar type is operated by twisting a small cylinder through an angle in the manual release is desired. The weight of the jumper creates a pull on the release both, thus causing friction on the surface of the cylinder which makes it difficult to rotate the cylinder when desired. It is next to impossible to open it quickly if the jumper's hands are gloved in addition to being stiff and partially numb.

Description of the Release Mechanism

With all the foregoing points in mind the release mechanism described in this article has been developed. It has been fully tested and shown that it easily fulfills the foregoing requirements.

The load due to the weight of the jumper is transmitted from the jumper's harness to the lower part of it in which the harness is permanently attached. The ring A is fastened to piece B which is a standard piece of 3/16 per cent nickel steel.

It is fastened as shown in Fig. 1, and the hook end is then hardened by heat treatment. Pieces B and C grip each other as the harness moves so that it is impossible to pull them apart when the standard sleeve D is in the position shown. Piece C is also fastened from 3/16 per cent nickel steel, and its hook end is also heat treated in order to resist wear due to standard use. Ring E is attached to piece C. The release is attached to ring F. Spring F rests upon the collar which has been formed on piece B, and the spring exerts pressure on the internal shoulder of sleeve D as shown. Consequently, the sleeve D will be held up to limit its travel. It should be noted that the release is attached to piece C. This if it is quickly attached to sleeve D. Whether F is attached to sleeve D by suitable means is shown.

It may be seen that if a tension load be applied to the rings A and B, it will be transmitted to the pieces B and C, and thence carried through the hardened landing jaws. The degree of the slope of the landing jaws is such as to cause the jaws to tend to slide slowly on each other when a tensile load is applied to the pieces B and C. This means that there will be very little friction, and hence very little friction to be overcome in sliding sleeve D. It was found by test that sleeve D would easily be moved against the action of spring F when the load was on the release.

To release the jumper it is only necessary to slide sleeve D down and thus depress the spring F until the upper surface of the sleeve D clears the lower surface of the landing jaw of sleeve B. Then, the sleeve D will slide down and the distance D will slide out from the piece B, and the connection between the jumper's harness and the parachute will be broken. If, due to circumstance, or to any other unforeseen cause, the piece C should stick to piece B, this can be avoided with pin G and then three piece C away from piece B. The design is such that contact is made between piece G and pin A as instant after the landing gear is released. This is shown in Fig. 2. After the connection is broken the sleeve D is thrust out by the spring F until the upper F joint against the collar on the piece B. In this way the release is self-releasing as the jumper is out of the harness and is no longer a danger to the jumper being struck by the landing spring.

If after landing it is desired to reengage the jumper's harness and the parachute it may be easily done by depressing sleeve D and locking the joint of piece G and C. Then the sleeve D will slide up and sleeve C will slide up against pin G when the release is ready for use once more.

Aerodynamic Properties of Thin Aerofoils N.A.C.A. Report No. 152

This investigation by F. H. Seaton and D. E. Town was undertaken by the National Advisory Committee for Aeronautics as an extension of N.A.C.A. Report No. 52, for the purpose of studying the effect of various modifications in a given wing section, including changes in thickness, height of lowest camber, taper in thickness, and taper in camber, with special reference to the development of thick, thin aerofoils. The method consisted in testing the wings in the N.A.C.A. 8-foot wind tunnel at speeds up to 90 statute (154 ft.) per second. The results were reported in a new class of very valuable data.

Some of the aerofoils developed showed trends of great promise. For example, one wing (No. 81) with a thickness at the center of 4.5 times that of the U. S. A. 10 showed both a coefficient of lift and a coefficient of drag 30 times that of the standard section. These thick sections will be especially useful on airplanes with a cantilever construction.

A copy of Report No. 152 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.



Progress

To design and build airplanes that show from year to year unmistakable signs of progress, requires an organization ever alert to the possibilities of new materials, processes and methods of manufacture.

To the end that Glenn L. Martin airplanes shall be leaders in their class, engineering and research organizations are maintained to originate and test out new theories, designs and processes. After these departments have developed a new design, checked and re-checked every detail, tested and selected materials and construction methods, there still remains a manufacturing organization with the skill and ability to produce the plane in exact accordance

to specifications. It is this complete co-ordination between departments that makes possible Martin Quality Aircraft.

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